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FERNALD PROJECT CLEANUP REPORT JULY 1992

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FERNALD PROJECT
CLEANUP REPORT JULY 1992

DOE establishes Fernald Field Office

Secretary of Energy James D. Watkins has established a DOE Field Office at the Fernald Environmental Management Project (FEMP), effective February 26, 1992. The Fernald Field Office now officially reports directly to Leo P. Duffy, the Assistant Secretary for Environmental Restoration and Waste Management at DOE Headquarters in Washington, D.C. The Fernald facility had previously reported to the department's Oak Ridge Field Office in Tennessee.

In establishing the Fernald Field Office, Admiral Watkins noted that safe and cost-effective cleanup of Fernald is a significant undertaking for the department, with estimated costs of $10 billion over the next 20 to 30 years.

"Because the FEMP is one of the most challenging and highly visible facilities we are cleaning up, I want to establish an organizational and management structure that conveys a clear understanding of responsibilities, authorities, and expectations," Watkins said.

Duffy said that DOE management and Tiger Team assessments at Fernald confirm additional resources and a stand-alone, self-sufficient status have been needed at the site.

"The designation of Fernald as a Field Office will allow the department to increase staffing in order to provide the necessary expertise and oversight for contractors conducting environmental investigations and cleanup operations at the FEMP," Duffy explained.

Fernald Field Office Manager Robert E. Tiller, now reporting directly to Duffy, stated that the new management structure will establish more clearly defined lines of authority and communications.

"We will continue to receive administrative and other support from the DOE Oak Ridge Field Office during the transition period. It is in the best interest of DOE and our neighbors to acquire or develop the necessary resources to continue moving ahead with the environmental restoration effort at Fernald," Tiller said.

The DOE is presently evaluating proposals from companies for the Environmental Restoration Management Contract (ERMC) at the FEMP. The three finalists are Waste Management Inc., Fluor-Daniel, and Ebasco Services Inc. DOE expects to award the ERMC contract in August 1992. A phase-in transition period is planned from September 1, 1992, through November 30, 1992, with the ERMC assuming full contractual responsibility for the FEMP on December 1, 1992. The DOE has extended the contract of Westinghouse Environmental Management Company of Ohio, the current Management and Operating contractor at the FEMP, through November 30, 1992.

The DOE has initiated and completed several key cleanup projects at the FEMP since the last community meeting February 25, 1992. Cleanup activities continue according to schedules in the 1991 Amended Consent Agreement between the DOE and the U.S. Environmental Protection Agency (U.S. EPA).

Recent accomplishments include the start of field work on the South Groundwater Contamination Plume project; off-site shipments of low-level thorium waste; completion of the Waste Pit Area Runoff Control project; removal of the Waste Pit 5 Experimental Treatment Facility, and continued extraction of contaminated "perched" groundwater from beneath former production buildings.

The *Fernald Project Cleanup Report* is intended to update the community on activities associated with environmental studies and cleanup efforts at the Fernald Environmental Management Project. The report is designed as a supplement to information provided at regular community meetings and through other communication activities.

The next community meeting is scheduled for Tuesday, July 21, 1992, at the Plantation, 9660 Dry Fork Road, Harrison, Ohio, 45030. Fernald Environmental Management Project technical personnel will be on hand at 6 p.m. to explain exhibits on various cleanup activities. The general meeting will begin at 7 p.m. and will include presentations by the Department of Energy, and statements by the U.S. and Ohio Environmental Protection Agencies, and Fernald Residents for Environment, Safety, and Health (FRESH). A question-and-answer session will follow.

This issue of *Fernald Project Cleanup Report* offers a brief description of activities which have occurred as part of the RI/FS since the last community meeting was held on February 25, 1992. Additional information, including more detailed reports, records, and other documents, is available at the Public Environmental Information Center located in the JAMTEK Building, 10845 Hamilton-Cleves Highway, just south of the Fernald Environmental Management Project.

The DOE continues to conduct the Remedial Investigation/ Feasibility Study (RI/FS) to determine the nature and extent of contamination on and around the FEMP. The RI/FS work includes development of cleanup alternatives for five separate Operable Units, which are areas grouped according to their similarities in terms of environmental concern or likely cleanup alternatives.

The RI/FS involves extensive sampling and analysis of soil, water, and other media to detect and measure levels of chemical and/or radiological contamination present in the Operable Unit areas. Once the nature and extent of the contamination have been determined, analysis of alternatives for removing or immobilizing the contamination is undertaken.

A Record of Decision will be issued by the U.S. EPA to specify the selected final remediation alternative for each of the Operable Units. The DOE will implement final cleanup actions as directed by the U.S. EPA in the Records of Decision.

Following is a general description of the five Operable Units and the Comprehensive Sitewide Operable Unit, and the timetables set forth in the 1991 Amended Consent Agreement for the DOE to submit Proposed Draft Records of Decision to the U.S. EPA for approval. In issuing a Record of Decision, the U.S. EPA announces the preferred alternative to accomplish final remediation and reasons for its selection:

Operable Unit 1 (Waste Pit Area) includes Waste Pits 1-6, the Burn Pit, the Clearwell, berms, liners, and soil within the Operable Unit 1 boundary. The Proposed Draft Record of Decision is due to U.S. EPA on or before December 6, 1994.

Operable Unit 2 (Other Waste Units) includes the flyash piles, other south field disposal areas, lime sludge ponds, solid waste landfill, berms, liners, and soil within the Operable Unit 2 boundary. The Proposed Draft Record of Decision is due to U.S. EPA on or before December 10, 1993.

Operable Unit 3 (Production Area) includes the production area and production-associated facilities and equipment (includes all above- and below-grade improvements), including, but not limited to, all structures, equipment, utilities, drums, tanks, solid waste, waste, product, thorium, effluent lines, K-65 transfer line, wastewater treatment facilities, fire training facilities, scrap metal piles, feedstock, and coal pile. The Proposed Draft Record of Decision is due to U.S. EPA on or before May 2, 1997.

Operable Unit 4 (Silos 1-4) includes: K-65 Silos 1 and 2, which contain radium-bearing radioactive wastes; Silo 3, which contains dried uranium-bearing wastes; Silo 4, which is empty; and berms, decant tank system, and soil within the Operable Unit 4 boundary. The Proposed Draft Record of Decision is due to U.S. EPA on or before June 10, 1994.

Operable Unit 5 (Environmental Media) includes groundwater, surface water, soil not included in the definition of Operable Units 1-4, sediments, vegetation and wildlife. The Proposed Draft Record of Decision is due to U.S. EPA on or before August 2, 1995.

Comprehensive Site-Wide Operable Unit: Following U.S. EPA issuance of Records of Decision for the five Operable Units, an evaluation of remedies selected for Operable Units 1-5, including Remedial Actions and Removal Actions, will be conducted to ensure that they are protective of human health and the environment on a site-wide basis as required by CERCLA, the National Contingency Plan and applicable U.S. EPA policy and guidance.

The 1991 Amended Consent Agreement also establishes a framework for an annual review of the need for additional Removal Actions, which can be initiated at any time during the course of the RI/FS. Removal Actions are near-term actions designed to reduce risk and work in tandem with Remedial Actions, which are final remedies. DOE submitted a list of proposed additional Removal Actions to the U.S. EPA in January 1992, along with corresponding schedules for submitting work plans or other appropriate documentation. The U.S. EPA approved six additional Removal Actions, bringing to 27 the total number of Removal Actions now identified under the terms of the 1991 Amended Consent Agreement. The Removal Actions are:

1) Contaminated Water Beneath FEMP Buildings
2) Waste Pit Area Runoff Control
3) South Groundwater Contamination Plume
4) Silos 1 and 2
5) K-65 Decant Sump Tank
6) Waste Pit 6 Residues
7) Plant 1 Pad Continuing Release
8) Inactive Flyash Pile Control
9) Removal of Waste Inventories
10) Active Flyash Pile Controls
11) Pit 5 Experimental Treatment Facility
12) Safe Shutdown
13) Plant 1 Ore Silos
14) Contaminated Soils Adjacent to Sewage Treatment Plant Incinerator
15) Scrap Metal Piles
16) Collect Uncontrolled Production Area Runoff (Northeast)
17) Improved Storage of Soil and Debris
18) Control Exposed Material in Pit 5
19) Plant 7 Dismantling
20) Stabilization of Uranyl Nitrate Inventories
21) Expedited Silo 3
22) Waste Pit Area Containment Improvement
23) Inactive Flyash Pile
24) Pilot Plant Sump
25) Nitric Acid Tank Car and Area
26) Asbestos Removals (Asbestos Program)
27) Management of Contaminated Structures at the FEMP

Operable Unit 1 - Waste Pit Area

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RI/FS Activities

Waste Characterization and Treatability: Chemical and radiological analyses of samples taken from materials in Waste Pits 1-4 and the burn pit are complete. This information is required to complete the Operable Unit 1 Remedial Investigation Report and treatability studies. Completion of these analyses represents the conclusion of the field investigations portion of the RI/FS for Operable Unit 1.

The waste material samples were analyzed at a U.S. EPA-approved laboratory to determine the concentration of radiological and chemical constituents in Operable Unit 1. This data is now being validated for use in RI/FS documents for Operable Unit 1. Validation of this data is expected to be completed in July 1992.

Data validation is a process in which a team of chemists, radiochemists, statisticians, quality assurance and other technical personnel, systematically review all aspects of data collection and laboratory analyses against an established set of criteria. Data validation is used to judge the quality and usefulness of the field and analytical data.

Samples of materials in the pits are being used for testing of waste treatment technologies currently under consideration, including cementation (stabilizing the waste with cement) and vitrification (transforming the waste into glass).

Waste stabilization studies continue at the IT Environmental Technology Development Center in Oak Ridge, Tenn. These studies involve mixing quantities of waste pit materials with differing amounts of cement and cement additives. Initial phases of solidification studies are complete, and this waste has been determined to be suitable for cementation. Each of the solidified waste forms from the treatability studies is subjected to a series of physical and chemical tests, including leaching the waste in acid, to arrive at the mix design which exhibits the best properties for retaining the physical form and stabilizing the waste materials. DOE has completed Stage I of a three-stage process. Stage II is presently under way, and the entire study is on schedule for completion by July 1993.

Vitrification studies also have been initiated at the IT Environmental Technology Development Center. Representative samples from each of the waste units are being mixed with a range of materials, including fly ash, and placed into high-temperature furnaces with the intent of forming glass. The study is intended to establish the best mix design which supports vitrification. While vitrification typically represents an expensive technology to implement, it provides many benefits such as improved immobilization of hazardous contaminants within a glass matrix and a reduction in waste volume. Vitrification studies on Operable Unit 1 wastes remain on schedule for completion by July 1993.

Samples of additional waste materials from Pits 5 and 6 and the Clearwell were obtained to support these ongoing treatability analyses. Up to eight 55-gallon drums of sludge from each waste unit were collected. This sampling activity was completed in February 1992. Some of the samples were transported to an off-site laboratory for treatability analysis. Remaining sample volumes have been archived at the FEMP for the purpose of supporting further treatability analysis in support of remedial design.

Radon Sampling Program: Consistent with the terms of the U.S. EPA's 1991 National Emission Standards for Hazardous Air Pollutants (NESHAP) Federal Facility Agreement, a sampling program was initiated in the waste pit area to measure the level of radon being released. The program involved a one-time measurement of radon release using Large Area Activated Charcoal Collectors (LAACC). Approximately 100 LAACCs were placed on Waste Pits 1, 2 and 3. The LAACCs were left on the pits for 24 hours, removed and then sent to an off-site laboratory for analysis. Analytical results show radon levels on all three waste pits are well below the emission limit of 20 picocuries per square meter per second, the federal standard established by the U.S. EPA's NESHAP. The average levels calculated for Pits 1, 2 and 3 are 9.1, 6.4, and 2.6 picocuries per square meter per second, respectively. These measurements are deemed representative of the long-term average radon emissions that can be expected from the three waste pits.

Measurements will be conducted to verify that radon emissions from Pit 4 are insignificant due to the synthetic and clay cover. No measurements will be required on Pit 5, because all exposed material in Pit 5 will be distributed to below the water level as part of Removal Action No. 18 (Control Exposed Material in Pit 5). This work is proceeding on schedule. Pit 6 was not identified as a potential radon source, due to the insignificant radium-226 levels in Pit 6 waste. No measurements will be required on the Clearwell due to its water cover.

Reports: The compilation of Operable Unit 1 Remedial Investigation and Feasibility Study reports is proceeding consistent with the schedules set forth in the 1991 Amended Consent Agreement.

Operable Unit 1

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Removal Actions

Waste Pit Area Runoff Control (Removal No. 2): The objective of this Removal Action is to collect and treat potentially-contaminated stormwater runoff from the waste pit area to prevent it from reaching Paddy's Run, a small stream which runs along the western boundary of the FEMP. This eight-phase Removal Action was completed June 15, 1992, ahead of the scheduled completion date of July 30, 1992.

An existing culvert was upgraded and expanded to be capable of handling more water (Phase 1). A 30-inch storm sewer pipe 750 feet long was installed (Phase 2). An existing 48-inch culvert was plugged to reverse the flow of water to the upgraded culvert and the completed 30-inch storm sewer pipe (Phase 3). A new inlet control structure was constructed on the east side of the waste pit area (Phase 4). A temporary access road was provided northeast of the waste pit area (Phase 5). The new sump station and underground piping are in place (Phase 6). The remainder of construction work was completed, including trench drains, storm sewers and a control structure on the north side of the waste pit area (Phase 7), and construction of a new standpipe overflow was completed (Phase 8).

This Removal Action provides runoff control, as well as a collection system, designed to collect stormwater runoff from the waste pit area and allow it to pass through the site's Biodenitrification Surge Lagoon and the effluent treatment system prior to discharge from the site to the Great Miami River.

Completion of this project and the continued operation of stormwater retention basins will result in the capturing of a significant amount of additional stormwater runoff from the FEMP, thus minimizing the potential for release of contaminants to the environment.

Pit 5 Experimental Treatment Facility (Removal Action No. 11): This Removal Action involved the dismantling of the Experimental Treatment Facility which was built in 1984 to test the feasibility of thermal drying for sludge material from Waste Pit 5. The Removal Action included dismantling the greenhouse-type facility and packaging the building materials and sludge for safe storage pending final disposition. This project was completed March 22, 1992, ahead of the scheduled completion date of April 11, 1992.

Control Exposed Material in Pit 5 (Removal Action No. 18): The objective of this Removal Action is to eliminate the possibility of airborne contamination resulting from exposed materials in the pit. A phased approach is being implemented using information obtained from Pit 5 liner repair activities; the pit berm investigation which addressed the pit's overall structural integrity; and the significance and magnitude of potential and actual emissions from the waste pit. The Removal Action will involve the repositioning of the exposed waste materials within the pit to provide for a continuous water cover over the residues. The DOE selected dredging as the method of transferring the material within Pit 5. EPA comments are currently being addressed and design work has been initiated. The Removal Action Work Plan was submitted to the U.S. EPA and the Ohio EPA on March 26, 1992.

Waste Pit Area Containment Improvement (Removal Action No. 22): This Removal Action is designed to minimize the potential for wind or water erosion of contaminated materials from access roads and exposed surfaces in the Operable Unit 1 area. The work plan is due to the U.S. EPA on or before August 31, 1992.

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Other Activities:

Minimum Additive Waste Stabilization: The DOE has initiated a Minimum Additive Waste Stabilization (MAWS) program at the FEMP in conjunction with Argonne National Labs, Duratek, and Catholic University of America. The MAWS program is an innovative approach to combining vitrification, water treatment, and soil washing processes to potentially save millions of dollars in remediation costs through achieving waste minimization. The purpose of the MAWS program is to demonstrate that vitrification is an economical treatment alternative for the large volumes of low-level radioactive and mixed wastes present in Operable Unit 1.

The MAWS program is designed to blend pit waste materials with contaminated soils and, through the use of electricity, melt them into a glass for safe and permanent disposal. Vitrification results in a net reduction in the total volume of waste requiring permanent storage. Laboratory tests have shown that wastes from some of the FEMP's waste pits, when vitrified by themselves, do not make a good glass. However, when these pit wastes are blended with contaminated soils in correct proportions, tests have shown that a good, stable glass at reduced volume is achievable.

While vitrification has an initial higher capital cost than cementation, in the long run a cost savings can be realized because cementation actually adds to the total volume of waste that must be disposed of properly. Vitrification results in significant reductions in net volumes of waste and eliminates or minimizes costly additives that otherwise would be required.

Presently, Catholic University of America, in cooperation with the DOE, is conducting bench-scale vitrification studies on samples taken from Operable Unit 1 waste materials. The MAWS bench-scale demonstration will process 0.3 to 1 metric ton of glass per day, then provide scale-up parameters for a pilot unit to process 20 metric tons per day. Eventually, full-scale facilities are planned to process glass at a rate of approximately 300 metric tons per day.

Activities presently taking place in support of MAWS include process design and procurement of equipment for installation in Plant 9. Compliance and safety documents are also being prepared. The contractor team will provide equipment and systems support, as well as technical and operating support for MAWS, both at the FEMP and at off-site locations.

Fernald Project Cleanup Report is prepared by Westinghouse Environmental Management Company of Ohio periodically for the U.S. Department of Energy, to inform the community about cleanup progress at the Fernald Environmental Management Project.

Address all inquiries regarding the *Fernald Project Cleanup Report* to :

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Operable Unit 2 - Other Waste Units

RI/FS Activities

Sampling: Samples from all of the Operable Unit 2 waste facilities have been analyzed for radiological and chemical constituents. Analytical data from the off-site laboratory has been validated. Data results are now being used to support the Operable Unit 2 RI/FS, waste treatment studies and ongoing modeling efforts. These samples were collected to supplement existing characterization data available for these facilities.

Validated analytical data is presently being incorporated into the Remedial Investigation Report to evaluate the potential risks to public health and the environment associated with the existing conditions within Operable Unit 2 facilities. This baseline risk assessment will be used to help establish remedial action objectives for Operable Unit 2 waste facilities.

Analyses of soil samples taken from the Firing Range found above-background levels of lead contamination in soils. The Firing Range is an isolated area formerly used by site armed security personnel for weapons qualifications. Air monitoring is planned at the Firing Range to determine if lead-contaminated soils have the potential to become airborne and pose a risk to human health and the environment. This additional air monitoring data is required to evaluate the need for near-term cleanup action at the Firing Range.

Reports: Treatability studies to establish whether identified waste treatment technologies are effective when applied to FEMP waste material are complete for Operable Unit 2. Data generated by the study will be used to support Operable Unit 2 treatment technology selection and remedy implementation.

Operable Unit 2 treatability investigations were focused on the application of cement-based solidification to Operable Unit 2 waste material. A three-stage treatability study was completed at the IT Environmental Technology Development Center in April 1992. The final stage of treatability involved leachate analysis and permeability testing. A Draft Treatability Study Report was completed in May 1992. The Draft Remedial Investigation (RI) Report for Operable Unit 2 is currently under revision. The RI report is due to the U.S. EPA on or before October 19, 1992. The purpose of the RI is to provide a summary of field investigations and to support the Feasibility Study for Operable Unit 2.

The compilation of other Operable Unit 2 RI/FS reports, including the Feasibility Study Report, are proceeding consistent with the schedules set forth in the 1991 Amended Consent Agreement.

Remedial Design: Examination of remedial alternatives for each Operable Unit 2 waste unit is ongoing. Conceptual design engineering was initiated for purposes of establishing preliminary design parameters and cost estimates. This work is necessary to provide for the prompt implementation of remedial action following issuance of the Record of Decision for Operable Unit 2.

Removal Actions

Inactive Flyash Pile Control (Removal Action No. 8): The objective of this Removal Action was to limit access to the Inactive Flyash Pile/Other South Field Disposal Areas while final remedial alternatives for these areas are being studied. This Removal Action was completed with the installation of warning signs and a chain-link barrier around the perimeter of the Inactive Flyash Pile/Other South Field Disposal Areas.

Inactive Flyash Pile (Removal Action No. 23): This Removal Action, which is a continuation of Removal Action No. 8, focuses on isolated areas of radiological surface contamination in the Inactive Flyash Pile/Other South Field Disposal Areas. A field investigation to determine if select locations within the Inactive Flyash Pile/Other South Field disposal areas require further action has been completed. The results of the investigation and other appropriate documentation were submitted to the U.S. EPA and the Ohio EPA on June 30, 1992.

Active Flyash Pile Controls (Removal Action No. 10): The objective of this Removal Action was to mitigate potential wind and water erosion at the Active Flyash Pile. This Removal Action was completed in late June 1992, with the installation of a silt fence around the base of the pile to mitigate stormwater runoff, and the placement of wind barriers to mitigate wind erosion. Minor grading and compaction were conducted and a chemical spray was also applied to the surface of the Active Flyash Pile to further mitigate the possibility of wind erosion and provide surface stabilization. A large portion of the pile is now inactive and will not receive new ash deposits.

Operable Unit 3 - Production Area

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RI/FS Activities

RI/FS Work Plan Addendum: The 1991 Amended Consent Agreement significantly expanded the definition of Operable Unit 3. The scope of Operable Unit 3 was modified to include all former process buildings, structures and equipment, and inventoried materials. A task team defined the sampling requirements and technical analyses which must be completed to support the Operable Unit 3 RI/FS process, and that information was incorporated into the RI/FS Work Plan Addendum for Operable Unit 3.

The RI/FS Work Plan Addendum for Operable Unit 3 was submitted to the U.S. EPA and the Ohio EPA on May 29, 1992, for review and approval. EPA is expected to comment on or approve the four-volume document by July 29, 1992.

The Work Plan Addendum includes an evaluation of available site characterization data and process knowledge, and identifies the need for additional data to evaluate risks and remedial alternatives. The Addendum also includes discussions on the various RI/FS tasks required, and schedules for conducting those activities.

The Work Plan Addendum also includes a recommended approach to be used in data collection, a proposed sampling and analysis plan, preliminary remedial action objectives, and remedial action alternatives. Planning for the implementation of the Work Plan is in progress. Approximately 24 months of field characterization work is anticipated for Operable Unit 3.

Removal Actions

Contaminated Water Beneath FEMP Buildings (Removal Action No. 1): This Removal Action was initiated to minimize the potential for uranium-contaminated groundwater to infiltrate the underlying aquifer from perched water zones located beneath some former production buildings. "Perched" water is isolated in pockets of groundwater which reside within the layers of clay-rich glacial soils that exist above the Great Miami Buried Valley Aquifer in the regional area of the FEMP. Perched water zones of concern due to the volume of water present and the concentration of contaminants have been identified beneath Plants 6, 2/3, 8, and 9 in the former production area. To minimize the potential for the movement of contaminants in these zones to the underlying aquifer, a series of wells were installed to extract the groundwater for treatment prior to discharge.

Pumping operations are in progress at all locations. A treatment system at Plant 8 continues to remove volatile organic compounds from the extracted water as necessary. The treatment system uses activated carbon filters to remove the organic compounds. The water is then processed through the FEMP's existing treatment system for the removal of uranium and eventually discharged to the Great Miami River. As of July 1, 1992, more than 180,000 gallons of extracted perched groundwater has been processed through the treatment system. Approximately 5,000 gallons are being treated each week.

Plant 1 Pad Continuing Release (Removal Action No. 7): The purpose of this Removal Action is to protect surface soils and regional groundwater from continuing releases of hazardous materials resulting from waste management activities on the eight-acre Plant 1 storage pad. This Removal Action is being conducted in three phases.

Phase I, the implementation of run-on and run-off control measures and the installation of underground utilities, is complete.

Phase II work, on schedule for completion by December 21, 1992, involves the installation of a new covered concrete storage pad (80,000 square feet) to be built adjacent to the existing Plant 1 storage pad. Soil excavation for Phase II work was completed in May 1992, and post-excavation sampling of the Phase II area continues. Installation of the Phase II concrete pad is approximately 50 percent complete.

Phase III involves activities to upgrade the existing Plant 1 storage pad, including the installation of a polyethylene liner and epoxy coating over the pad surface to minimize contaminant migration to the environment. Phase III is on schedule for completion by February 21, 1995.

Covered storage structures planned for the Plant 1 storage pad will be equipped with containment facilities for spill control, drainage, stormwater runoff and run-on control, and fire suppression.

Removal of Waste Inventories (Removal Action No. 9): This Removal Action involves the characterization, overpacking, and disposition of low-level radioactive waste materials. The removal of waste inventories is ongoing at the FEMP.

The FEMP received approval from the DOE-Nevada Operations Office to dispose of five general waste streams at the Nevada Test Site (NTS), including: process area scrap wastes (scrap metal and wood); construction and Removal Action waste (demolition debris);

Operable Unit 3

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residues and thorium waste (refinery feed and oxides); and baled trash. The approval includes all backlog and currently-generated wastes at the FEMP, which can be shipped to NTS for disposal contingent upon meeting all NTS Waste Acceptance Criteria.

The first shipment of 38 drums of low-level thorium waste (oxides) arrived at NTS June 12, 1992. Approximately two truck shipments per week are planned for the 1,624 drums of low-level thorium waste approved for disposal at NTS.

As of July 1, 1992, more than 74,000 drum equivalents of low-level waste had been shipped to NTS in Fiscal Year 1992. (A drum equivalent is 7.4 cubic feet, the amount of material which can fit into a 55-gallon drum). The DOE goal is to ship 100,000 drums equivalents to NTS before the fiscal year ends September 30, 1992.

Stabilization of Uranyl Nitrate Inventories (Removal Action No. 20): The processing of uranyl nitrate inventories is scheduled to begin in mid-July 1992. Operational readiness reviews and safety systems checks were conducted in June 1992. Uranyl nitrate is an intermediate product in the former uranium recovery process at the FEMP. There are approximately 230,000 gallons of acidic uranyl nitrate stored in 21 tanks in or near the Plant 2/3 Refinery.

A 1991 inspection of the tanks revealed that small leaks had developed in the piping system associated with the tanks. This Removal Action is designed to process the uranyl nitrate to a stable form.

Refinery systems integrity testing is complete. The uranyl nitrate inventory will be neutralized and converted to a solid form which can be drummed and properly stored in warehouses pending final disposition.

Safe Shutdown (Removal Action No. 12): This Removal Action was initiated to ensure the safe and permanent shutdown of production facilities including the removal of uranium and other process/raw materials from equipment and lines in the former production area. Disposition of uranium products and recoverable residues is an integral part of Safe Shutdown activities.

Preliminary assessments of the scope of actions required to achieve a safe shutdown configuration of buildings and equipment have been completed for Plants 1, 2/3, 4, 8, and 9. Assessments for Plants 5, 6, and the Pilot Plant are now in progress.

An annual update of FEMP procedures to ensure that appropriate documentation of Safe Shutdown activities is entered into the Administrative Record was submitted to the U.S. EPA on June 30, 1992.

So far, more than 2.6 million pounds of uranium products have been transferred from the FEMP under the Safe Shutdown program since the production mission ended.

Plant 1 Ore Silos (Removal Action No. 13): A revised work plan was submitted to the U.S. EPA on March 27, 1992. Conditional approval of the work plan was received from the Ohio EPA on April 13, 1992, and from the U.S. EPA on May 18, 1992.

The project will involve the dismantling of the Plant 1 Ore Silos and their support structures. Deteriorated valves caused the silos to leak material onto a concrete pad in February 1992. The material, known as cold raffinate, is the waste residue from the processing of uranium ore after uranium is removed. Remaining material in the silos will be removed, containerized and placed in safe storage pending final disposition. All 14 silos and support structures will be dismantled and demolished under this Removal Action.

Design work was completed May 6, 1992. Field activities are scheduled to begin in October 1992, and this Removal Action is on schedule for completion by December 18, 1993.

Contaminated Soils Adjacent to Sewage Treatment Plant Incinerator (Removal Action No. 14): The scope of this Removal Action will include the isolation or removal and disposition of contaminated soils with elevated levels of uranium in the vicinity of an out-of-service solid waste incinerator at the sewage treatment plant. The project is designed to mitigate the potential for contaminant migration. Activities will include characterization, removal, containerization, storage and disposal of materials. A revised work plan for this Removal Action, incorporating U.S. EPA comments, was submitted to the U.S. EPA on March 30, 1992. Conditional approval of the work plan was received from the U.S. EPA on May 18, 1992. Design work is now in progress. Excavation of contaminated soils is on schedule for completion by August 18, 1992.

Scrap Metal Piles (Removal Action No. 15): This Removal Action will address the stabilization and disposition of low-level radioactive waste scrap metal currently stockpiled outdoors at the FEMP. The project is designed to eliminate the potential threat of material releases to the environment due to wind or rain from 1,300 tons of scrap copper and about 3,000 tons of recoverable scrap metals. Comments on the work plan were received from the U.S. EPA on

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Operable Unit 3

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March 4, 1992. A revised work plan, incorporating U.S. EPA comments, was submitted to the U.S. EPA on April 3, 1992. Conditional approval of the work plan was received from the U.S. EPA on May 18, 1992. A contract was awarded June 19, 1992, to Scientific Ecology Group, Inc., of Oak Ridge, Tenn., for the final disposition of 2,210 tons of ferrous scrap metal. Most of the 2,210 tons will be reused. Non-recoverable scrap metal is presently being packaged into appropriate containers and shipped off site for disposal under Removal Action No. 9 (Removal of Waste Inventories).

Improved Storage of Soil and Debris (Removal Action No. 17): Improved storage for soils contaminated with low-level radioactive materials or petroleum products, and contaminated debris, will be managed under this Removal Action. Activities under this Removal Action will include characterization, interim storage, and management of contaminated soils and debris until their final remediation under Operable Unit 3. The work plan was submitted to the U.S. EPA on March 25, 1992, for review and approval.

Plant 7 Dismantling (Removal Action No. 19): The work plan for this Removal Action is due to the U.S. EPA by April 20, 1993. The characterization plan is currently in progress. Plant 7 was originally built to convert uranium hexafluoride (UF6) to uranium tetrafluoride (UF4). Plant 7 has been idle since the mid-1950s, when it was replaced by operations in the Pilot Plant. All process equipment was removed from Plant 7 in the late 1950s. Plant 7 is presently being used for storage of empty cans and drums. Activities under this Removal Action will involve decontamination and dismantling of the building.

Pilot Plant Sump (Removal Action No. 24): This Removal Action was initiated to address contaminated liquids and sludges remaining in an out-of-service sump at the FEMP's Pilot Plant. The below-grade sump is a stainless steel cylinder approximately two feet in diameter and 10 feet deep. The sump was installed to remove liquids from the floor drains of the Pilot Plant and was actively used only during the renovation of the Pilot Plant in 1969. Analytical results show high concentrations of metals (lead, copper, chromium, and nickel), as well as thorium and volatile organic compounds. The work plan for this Removal Action is on schedule to be submitted to the U.S. EPA by July 31, 1992.

Nitric Acid Tank Car and Area (Removal Action No. 25): This Removal Action was initiated to remove the residual contents of a Nitric Acid Tank Car, decontaminate and dispose of the tank car itself, and address potentially contaminated surrounding soils related to the tank car. The high-grade stainless steel tank car stored nitric acid, which was formerly used at the FEMP and was operated from 1952 until 1989. The tank car has a capacity of 100,000 pounds and now contains approximately 100 gallons of dilute nitric acid. The work plan for this Removal Action is due to the U.S. EPA by October 30, 1992.

Asbestos Removals (Asbestos Program) (Removal Action No. 26): This Removal Action documents ongoing asbestos abatement activities at the FEMP to mitigate the potential for contaminant release and migration. Abatement activities within the existing Asbestos Program include repairs, encasement, encapsulation or removal of asbestos-bearing materials which exist in many buildings on the FEMP site. A proposed work procedures document was submitted to the U.S. EPA on May 19, 1992, for review and approval. Field activities in support of asbestos identification and abatement are in progress.

Management of Contaminated Structures at the FEMP (Removal Action No. 27): This Removal Action was initiated to address contaminated structures and mitigate any potential threat to human health and the environment associated with any contaminated structures at the FEMP. Characterization data are being gathered and required work activities are being formulated in support of the Removal Action. An Engineering Evaluation/Cost Analysis (EE/CA) to support the identification of additional Removal Actions for managing contaminated structures at the FEMP is due to the U.S. EPA by December 15, 1992.

Operable Unit 4 - Silos 1-4

RI/FS Activities

K-65 Vertical (Berm) Borings: Samples were collected from four vertical borings into the earthen berm surrounding the K-65 silos for the purpose of determining whether measurable quantities of residual materials have leaked through the walls of the silos into the surrounding berms. Results were received from the independent laboratory and validation of these results is complete. Evaluation of the validated analytical data is in progress. This information is required to support the completion of the Remedial Investigation and Feasibility Study reports for Operable Unit 4.

K-65 Low-Angle (Slant) Borings: Soil samples were collected from five borings advanced beneath the K-65 silos to determine whether residual materials may have migrated from the tanks or the associated underdrain system into the underlying soils or perched groundwater. Perched groundwater was encountered in each of the five borings and samples were taken of the groundwater. Preliminary sample analyses from the on-site laboratory indicates the presence of low concentrations of radionuclides in the soils and perched water underlying the silos. Preliminary sample analyses results have been received from the off-site independent laboratory, which conducted full chemical and radiological analyses. Validation of these results is complete. Evaluation of the validated analytical data is in progress. This information is required to support the completion of the Remedial Investigation and Feasibility Study reports for Operable Unit 4.

Resampling of K-65 Residues: Analyses of samples taken from residue material in K-65 Silos 1 and 2 have been completed by an independent laboratory. The data was compiled by the laboratory and transmitted to the FEMP and validation of analytical results is complete. This information is being used to establish the physical, chemical, and radiological characteristics of the waste materials for purposes of determining appropriate treatment methods for K-65 contents.

Reports: Two Treatability Study Work Plans have been completed to support Operable Unit 4 activities. A Treatability Work Plan has been approved by the U.S. EPA for the evaluation of solidification and chemical extraction technology for Operable Unit 4 wastes. This Treatability Work Plan describes a five-stage process for evaluating the applicability of these technologies. The solidification study being conducted under this work plan involves the evaluation of different cement and additives, focused on producing the optimal mix design which retards contaminant migration and provides acceptable physical properties such as weight and strength.

The chemical extraction portion of the study is focused specifically on the potential for removing certain radionuclides and heavy metals from the K-65 residues through acid/solvent digestion and extraction techniques. The purpose of this portion of the study is to examine the feasibility of removing certain contaminants of concern to levels which would reduce the volume requiring eventual disposal, or reduce the design requirements for the ultimate disposal facility. Studies, being conducted under this plan at the IT Environmental Technology Development Center, are expected to be completed in September 1992.

Another Operable Unit 4 Treatability Study Work Plan examining vitrification has been approved by the U.S. EPA. This plan specifically examines the technical feasibility of removing the waste materials from Silos 1, 2, and 3 and transforming them to glass in a high-temperature furnace. Samples of materials in the silos have been transferred to the DOE Pacific Northwest Laboratory in Richland, Washington, to perform the tests. Results from this study are expected to be received in September 1992.

These technologies are being tested to provide valuable information to support the determination of which technology provides the most environmentally-sound, cost effective and implementable method for treating the wastes prior to final disposal. The compilation of other Operable Unit 4 RI/FS reports, including the Remedial Investigation Report and the Feasibility Study Report, are proceeding consistent with the schedules set forth in the 1991 Amended Consent Agreement.

Operable Unit 4

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Removal Actions

K-65 Decant Sump Tank (Removal Action No. 5): Sample analysis results have been received from the independent laboratory and the FEMP laboratory. Samples of liquid removed from the K-65 Decant Sump Tank, and sludge removed from the base of the tank, were analyzed and characterized to determine proper treatment and final disposition. Removal of this liquid from the underground sump tank reduces the potential for leakage of contaminants into surrounding soils. This Removal Action was completed in April 1991, when approximately 8,000 gallons of contaminated water was pumped from the K-65 Decant Sump Tank. The removed water was stored in above-ground tanks in Plant 2/3. Treatment of the liquid was completed in May 1992. The K-65 Decant Sump Tank was used to collect and store liquid that drained from the K-65 silos as the slurried material settled.

Silos 1 and 2 (Removal Action No. 4): This Removal Action was completed in December 1991 with the installation of bentonite clay over radium-bearing radioactive waste material in the K-65 silos.

Covering the silo contents with a layer of bentonite clay accomplished two key objectives. It substantially reduces the accumulation of radon in the silo headspace—between the surface of the residues and the dome—thereby reducing radon emissions to the environment. Secondly, it provides protection from potential releases to the environment in the event of a silo dome collapse.

The effectiveness of this Removal Action is determined by comparing the concentration of radon in the silo headspace before and after the placement of bentonite. Such a comparison indicates the bentonite has resulted in more than a 90 percent reduction of radon accumulation in the silo headspace.

Expedited Silo 3 (Removal Action No. 21): This Removal Action was completed in January 1992, with the removal of an out-of-service dust collector and hopper assembly from the dome of Silo 3, eliminating the potential for release of radioactive material to the environment. All pathways were permanently sealed to prevent the release of silo contents to the atmosphere. Disposition of the dried uranium-bearing metal oxides in Silo 3 is being addressed under the Operable Unit 4 RI/FS.

Operable Unit 5 - Environmental Media

RI/FS Activities

Paddy's Run Seepage Investigation Study: An investigation continues to better determine how Paddy's Run interfaces with the Great Miami Buried Valley Aquifer. The study is evaluating the impact that leakage of surface water through the bed of Paddy's Run might be having on local groundwater flow. A series of wells have been installed along Paddy's Run, and sampling activities are in progress to determine the extent of any contamination in the aquifer at that location. Additional studies of the flow of the creek itself are under way to help determine what, if any, relationship exists between any identified contaminants in the aquifer at that location and the intermittent surface water flow conditions in the creek. This information is important to determine what type of response action may be warranted. Collected samples will be analyzed and resulting data will be included in the final Remedial Investigation and Feasibility Study reports for Operable Unit 5.

Miscellaneous Additional Wells Program: Sixteen additional wells recently were installed around the perimeter of the FEMP for the purpose of filling data gaps which have been defined through recent groundwater sampling activities. Samples collected from the 16 wells will be analyzed, and the results will be examined to determine if further contingency wells will be required.

Operable Unit 5 Work Plan Addendum: Soil and perched groundwater sampling will be conducted in the following former production areas: Plant 1 Pad; southeast quadrant of the production area; fire training area; KC-2 Warehouse area; scrap metal area; electrical substation; K-65 slurry line, and the Clearwell line. The Operable Unit 5 Work Plan Addendum containing this scope of work was transmitted to the U.S. EPA and Ohio EPA in April 1992, for review and approval. EPA comments are presently being addressed.

Reports: DOE submitted a revised Soil Washing Treatability Study Work Plan to the U.S. EPA on March 4, 1992, which responds to U.S. EPA comments on the previously submitted plan. The U.S. EPA approved the DOE responses, and those comments are currently being incorporated into the treatability work plan designed to examine physical and chemical separation of uranium from soils. Significant cost and schedule improvements could be realized in the implementation of final remedial actions if an

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implementable soil washing treatment technology can be identified. Data generated from the study will be used to support the completion of the Operable Unit 5 Feasibility Study. The preparation of other Operable Unit 5 RI/FS reports is proceeding consistent with the schedules set forth in the 1991 Amended Consent Agreement.

Removal Actions

South Groundwater Contamination Plume (Removal Action No. 3): The purpose of this Removal Action is to protect public health by limiting access to the use of uranium-contaminated groundwater in an area south of the FEMP. This Removal Action is broken into five parts.

Part 1 includes installation of an alternate water source to an industry affected by the contamination plume. Part 1 construction began May 13, 1992. This portion of the project involves the installation of production wells outside the plume area and a water distribution system to the affected industry. Analysis of samples taken from the selected well site to determine the adequacy of the quality and quantity of the extracted water showed the groundwater in the well field area is within natural background levels for uranium and other chemical parameters. This portion of Part 1 of the Removal Action, originally scheduled for completion by July 14, 1992, is now scheduled to be operational by December 7, 1992. The DOE requested and the U.S. EPA approved this schedule extension for Part 1, due to the DOE's easement acquisition difficulties. Construction will be completed when access to all required properties is achieved. Several property owners have denied access and/or refused offers to purchase easements required for Part 1 construction. Government condemnation proceedings are in progress to acquire access to those easements.

Another affected industry will be provided with an alternate water supply by being tied into the proposed public water system.

Part 2 involves the installation of a groundwater recovery well system to pump groundwater from the South Plume through a force main and back to the FEMP for monitoring and discharge to the Great Miami River. As a result of information obtained from a separate remedial investigation that is being performed at the Paddy's Run Road Site (PRRS), additional concerns have been identified in the South Plume area.

The PRRS consists of several industries that in past years discharged both organics and inorganics which have now found their way to the Great Miami Buried Valley Aquifer. The PRRS plume extends to very near the location of the proposed Part 2 well field as described in the November 1990 South Plume Engineering Evaluation/Cost Analysis (EE/CA). Operation of a uranium recovery well field at the location originally described in the EE/CA could result in the spreading and/or extraction and discharge of contaminants from the PRRS plume to the Great Miami River.

As a result of these conditions, the Part 2 well field was relocated to an area north of the plume being investigated by PRRS. An addendum to the EE/CA entitled "Explanation of Significant Differences" was prepared to reflect the relocation of the well field. That document is available for review in the Public Environmental Information Center.

Use of the FEMP's current effluent outfall pipeline to the Great Miami River will be discontinued due to its age and limited capacity to handle future flow. A new effluent outfall pipeline will be installed under Part 2 of this Removal Action. The new outfall pipeline will parallel the existing outfall pipeline to the Great Miami River.

Part 2 work also includes increasing the pump-out capacity at the Stormwater Retention Basin to reduce the potential for future overflow of the basin.

The drawings and specifications for the force main, the new outfall pipeline, and for providing increased pump-out capacity at the Stormwater Retention Basin, are complete. Construction on this portion of the project is expected to begin in July 1992. The groundwater recovery well system is expected to be operational by January 1993.

A Dissolved Oxygen System also will be installed under Part 2. It has been determined that the groundwater to be extracted under Part 2 of this Removal Action has a low dissolved oxygen content. The FEMP's National Pollutant Discharge Elimination System (NPDES) permit requires FEMP wastewater to be discharged at a minimum of five parts of dissolved oxygen per million parts of water (ppm). Groundwater extracted under Part 2 will be aerated prior to discharge to the Great Miami River in order to comply with the FEMP's current NPDES permit.

Part 3 involves construction of an Interim Advanced Wastewater Treatment (IAWWT) system. The IAWWT system will remove uranium from site wastewater streams and, by doing so, will reduce the amount of uranium

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discharged to the Great Miami River. The design of the IAWWT system was modified to incorporate the additional treatment capacity required to address the relocation of the Part 2 well field. The new location is in an area of higher uranium concentration which means that more uranium will have to be removed from site wastewater streams to achieve the desired reduction of uranium discharges to the river.

Two trailer-mounted IAWWT facilities were fabricated off site and have been delivered to the FEMP. These facilities and associated support systems will comprise the IAWWT unit to be located near the Stormwater Retention Basin. Construction activities began in February 1992, and are nearing completion.

Construction of a second IAWWT unit to be installed in the FEMP's existing Biodenitrification Effluent Treatment building is nearing completion. The IAWWT system, which includes the unit at the Stormwater Retention Basin and at the Biodenitrification Effluent Treatment building, is scheduled to be operational by July 30, 1992.

Part 4 of the Removal Action involves groundwater monitoring and institutional controls to prevent the use of contaminated groundwater. This activity is being implemented through the existing FEMP Groundwater Monitoring Program. The program has been expanded to include more frequent monitoring of private wells located near areas of known contamination.

Part 5 involves additional groundwater investigations in the vicinity of the South Plume. Additional investigations will be performed under Part 5 to identify the location and extent of any remaining contamination attributable to the FEMP in the groundwater south (downgradient) of the recovery wells to be installed under Part 2.

The Part 5 investigation will include Hydropunch sampling, a soil vapor survey if required, sampling of existing monitoring wells, and groundwater modeling activities. Hydropunching is an efficient method for extracting groundwater samples without the expense of installing wells. A soil vapor survey is used to help determine the presence of volatile organic compounds in subsurface soils and groundwater.

Because the U.S. EPA has issued a proposed limit of 20 parts per billion (ppb) for uranium in drinking water, the investigation will attempt to identify the location of the contamination in the aquifer exceeding the 20 ppb level. The information obtained will be used to allow the FEMP to limit access to this water until additional response actions for this area can be implemented.

Collect Uncontrolled Production Area Runoff-Northeast (Removal Action No. 16): The scope of this Removal Action is to collect stormwater runoff from perimeter areas of the 136-acre production area which are not presently draining into the Stormwater Retention Basin. The work plan for this Removal Action was submitted to U.S. EPA on March 2, 1992. The DOE received U.S. EPA comments on April 7, 1992. Those comments were addressed and a revised work plan was submitted to the U.S. EPA on May 21, 1992. The design package was issued for bid in June 1992. Construction is expected to begin by August 1992. Construction is scheduled for completion by August 1993.

Additional RI/FS Activities

RI/FS Risk Assessment Work Plan Addendum: A revised RI/FS Work Plan Addendum incorporating U.S. EPA comments was submitted to U.S. EPA in February 1992 for review. This document defines the methodologies to be employed at the FEMP for completion of required risk assessments which support each of the five Operable Units. The addendum was approved by the U.S. EPA on May 13, 1992.

Engineered Waste Management Facility Study: As part of the RI/FS, an investigation is in progress examining the geotechnical and geochemical properties of the soils on the FEMP. The purpose of this investigation is to determine the technical feasibility of siting an above-ground facility at the FEMP to accommodate waste materials derived from remedial activities. The investigation involves the installation of a number of monitoring wells and the completion of a series of subsurface borings along the northern and eastern portions of the FEMP. The required borings and wells have been completed, and collected samples are currently being analyzed. This study, scheduled for completion in January 1993, will support the evaluation of alternatives in the Feasibility Study reports for each of the Operable Units.

Fernald Remediation Integration Program: The purpose of the Fernald Remediation Integration Program (FRIP) is to provide a mechanism for integrating remediation requirements, schedules, and designs across the five Operable Units. The FRIP is

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designed to eliminate inconsistencies, redundancies, duplication of effort, and provide an integrated remediation complex within current schedules at lower overall cost. The FRIP will also integrate the Remedial Action projects with non-CERCLA projects at the FEMP, including waste management and technology development.

Background Soil Sampling: As part of the RI/FS, a series of 30 shallow borings were completed at an off-site location northwest of the FEMP. The purpose of these borings was to collect a series of samples to characterize the naturally occurring concentrations of selected metals, inorganics, and radionuclides in surface soils in the vicinity of the FEMP. Information collected from these samples will be used to support the risk assessment process under the RI/FS. Analytical results of the collected samples are expected to be completed in July 1992.

Administrative Record RI/FS Additions

The following documents are among those which have been added to the Administrative Record since the last community meeting took place on February 25, 1992. The FEMP's Administrative Record is located in the Public Environmental Information Center, JAMTEK Building, 10845 Hamilton-Cleves Highway, Harrison, Ohio, 45030. The telephone number is (513) 738-0164.

- Annual Environmental Report for Calendar Year 1990
- Plant 1 Ore Silos Removal Action Work Plan
- Groundwater Monitoring Information and the (RCRA) Part B Permit Application
- Revised Community Relations Plan
- Transcript of Proceedings, U.S. Department of Energy Fernald Environmental Management Project, Community Meeting, February 25,1992
- K-65 Silos Data Validation and Characterization
- Operable Unit 4 Treatability Study Work Plan for the Vitrification of Residues from Silos 1, 2, and 3
- Approval of the Revised Silos 1 and 2 Removal Action Bentonite Effectiveness Environmental Monitoring Plan
- Finding of No Significant Impact, Engineering Evaluation/CostAnalysis-Environmental Assessment, Waste Pit Area Stormwater Runoff Control
- Submittal of Operable Unit 5 (Environmental Media) RI/FS Work Plan Addenda, Revision 2
- Water Supply Data-Ohio EPA